IN THE SPECIFICATION

Please replace the paragraph on page 10 beginning at line 22 continuing to page 11, line 2, of the Specification with the following amended paragraph:

The frequency at which vibrations are sensed may also vary depending upon various factors including the type of fluid nozzle being operated. In one particular embodiment, for instance, the vibration sensor may be configured to sense vibrations at a frequency of from 0 Hz to about 10,000 Hz, such as from about 500 Hz to about 8,000 Hz. In one particular embodiment, for instance, the vibration sensor may sense vibrations at a frequency of from about 2,000 Hz to about 7,000 Hz. In order to better monitor vibrations, in one embodiment, an amplifying device 36 or signal filtering device 38 may be placed in association with the vibration sensor for amplifying the vibrations or removing signals outside the frequencies of interest that are received by the controller.

Please replace the paragraph on page 15, lines 3 – 13, of the Specification with the following amended paragraph:

The controller 2 that is used to receive information from the vibration sensor and relay that information to an operator can range from very simple to very complex. For instance, in one embodiment, the controller 2, which can be a microprocessor or be in communication with a microprocessor 4, can receive information from the vibration sensor and set off a visual and/or audible alarm 8 that indicates when a nozzle is not operating properly. In an

alternative embodiment, the controller 2 can comprise a display or annunciator 6 for nozzle monitoring. The display 6 may present to a user the frequencies at which vibrations are occurring and the amplitude of those frequencies which can then be used by an operator for determining whether the nozzles are operating properly.

Please replace the paragraph on page 15 beginning at line 21 continuing to page 16, line 7, of the Specification with the following amended paragraph:

As shown in Figure 1, the agrochemical dispensing system is illustrated being drawn across a field by a tractor 22. The system includes a liquid reservoir 24 for holding an agrochemical liquid. The reservoir 24 includes an outlet and a pumping means such as a pump 42 that is placed in communication with a distribution manifold 26. The distribution manifold 26 includes a spray boom that includes a plurality of dispensing tubes or lines. At the end of each dispensing tube is a fluid nozzle 20. In accordance with the present invention, a vibration sensor may be placed in association with one or more of the nozzles 20 for monitoring the operation of the nozzle during application of an agrochemical. The vibration sensor may sense vibrations in a nozzle in one or more directions for monitoring any irregularities in fluid flow rate or in the fluid spray pattern. If the nozzles 20 are pulsating nozzles, the vibration sensors may also indicate irregularities in the actuation characteristics of valves that may create the pulsating spray. For example, if the spray is pulse width modulated, changes in the frequency and duty cycle of the spray actuation may be determined.

Please replace the paragraph on page 30, lines 1 – 5, of the Specification with the following amended paragraph:

Manufacturers such as Measurement Specialties Inc., Endevco and ~~Pansasonic~~ Panasonic produce components that may be used in the present invention. If low-cost piezo sensors are used, a charge amplifier 36 may be desired and the frequency response of the circuit may have to be considered.

Please replace the paragraph on page 25 beginning at line 13 continuing to page 26, line 6, of the Specification with the following amended paragraph:

In addition to investigating nozzle vibration, a series of tests investigated sensing of electrical characteristics as a means to diagnose pulse valve operation independently or in combination with vibration sensing. Since the valve is actuated by a square wave, the rising and falling edges of the actuation signal can provide triggering and timing references for signal detection and analysis. For typical valve failures (stuck open, stuck closed, missing plunger), the current flow into the valve was measured. Each failure was observed to have a characteristic current signature. Additionally, the relation between the current flow and valve vibration was measured (Figures 15 and 16). These results suggest that sensing of valve electrical characteristics can be used alone or in combination with valve and nozzle vibration to sense operation of a pulsed flow control system. In these examples, valve coil current was measured as a voltage drop across a small

resistance in series with the coil. Further experiments used semiconductor current sensors. A number of low-cost magnetic flux sensors may be used in this application. Figure 15A shows <u>that the controller 2 can include a current and voltage relational device 40 that selectively shows</u> the voltage and current relationship for a pulsation valve operating properly. Approximately 10 ms after the valve actuation voltage is raised from 0 to 12 Vdc, the inrush current increases and indicates a characteristic “bump”. Figure 15B shows the time relationship <u>40</u> between the inrush current and the vibration (indicated as the acceleration) of the valve body. Likewise, after the voltage is returned to zero, the current drops to zero and another vibration signature – the closing of the valve – is observed.